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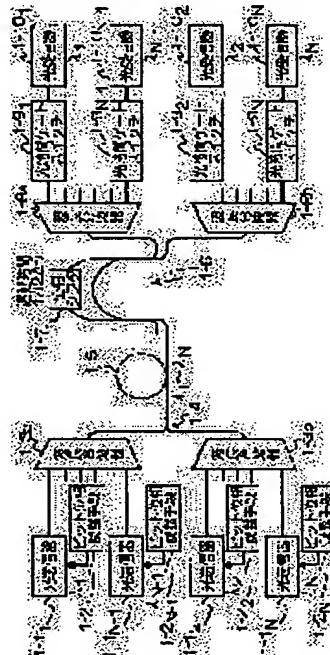
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## (54) WAVELENGTH MULTIPLEX OPTICAL TRANSMISSION SYSTEM AND TRANSMISSION METHOD

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a wavelength multiplex optical transmission system and a transmission method with an excellent band utilization efficiency.

**SOLUTION:** The wavelength multiplex optical transmission system is provided with an optical transmitter 1-1 that generates N optical signal waves modulated with an optical frequency interval  $\Delta f$  [Hz] at a modulation speed B [bit/s] (where  $B/\Delta f \leq 1$  [bit/s/Hz]), wavelength synthesizers 1-3a, b that synthesize them, an asymmetrical Mach-Zehnder interferometer element 1-6 whose optical path length difference is  $c/(2nc\Delta f)$  (where c is the velocity of light and nc is an equivalent refractive index of a guide path) incorporating a phase shifter 1-7, wavelength branching devices 1-8a, b that selectively transmit an optical signal with a desired wavelength, an optical time gate switch 1-9 that extracts a signal for a time from  $1/(2\Delta f)$  [s] to T [s] (where T is a one-bit time) in the unit of bits, and a bit phase adjustment means 1-2 that matches bit phases of wavelength signals at the input of asymmetrical Mach-Zehnder interferometer element 1-6.



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